Catchments as simple dynamical systems: A case study on methods and data requirements for parameter identification

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In many rainfall-runoff models at least some calibration of model parameters has to take place. Especially for ungauged or poorly gauged basins this can be problematic, because there is little or no data available for calibration. A possible solution to overcome the problems caused by data scarcity is to set up a measurement campaign for a short time period. With the employed approach based on the theory of Kirchner (2009), a model was developed and applied to the Rietholzbach catchment in Switzerland (Teuling *et al.*, 2010, Seneviratne *et al.*, 2012), with only two parameters. These two parameters describe a unique storage-discharge relation. The model is constructed such that the parameters can be determined not only with automatic calibration, but also by recession analysis and a priori from Boussinesq theory. The automatic calibration and the recession analysis have been fed with different selections of the full data record as well as with the full data record itself. For Boussinesq theory, catchment characteristics were given as required input. In the end, a comparison of the performance of the three different methods was made, and a comparison on the amount of data that is required by each of the three parameter identification methods.

References

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